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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,921	01/09/2006	Peter George Van De Haar	NL030823US1	3830
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EXAMINER FITZPATRICK, ATIBA O				
ART UNIT 2624		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/563,921

**Applicant(s)**

VAN DE HAAR ET AL.

**Examiner**

ATIBA O. FITZPATRICK

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment. Refer to the rejection section below for specificity.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 7-9 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent and recent Federal Circuit decisions indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (in particular, a machine), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claims recite a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example, the body of the claims should state that the steps are carried out by a processor. A human can manually apply corrective images using a transparency overlaid over a hardcopy image. No transformation of matter is claimed. While the claim

limitations can be interpreted to show manipulation of data, the result of the manipulation is not depicted in a human perceivable format.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 4, and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5434902 (Bruijns).

As per claim 1, Bruijns teaches an imaging arranged to reduce an artifact in a three-dimensional reconstructed volume comprising a plurality of planar images, said imaging system comprising **(Limitations present only within the preamble are not given patentable weight)**

an image artifact reducer arranged to process said planar images with a first corrective image for eliminating a first source of structured noise in said images, thereby producing a gain corrected image, and arranged to apply a second corrective image to the gain corrected image for eliminating a second source of structured noise in said images  
**(Bruijns: abstract: "correction factors for all pixels... image of an object having a spatially homogeneous brightness distribution... Various gain characteristics can be stored so that vignetting is compensated for even when the adjustments of the**

imaging system are varied... the vignetting effects in either of the sub-images are inevitably different due to the use of a beam splitter... The vignetting is decomposed into vignetting effects in a horizontal and in a vertical direction in the recombined image. Correction for vignetting is achieved by multiplying decomposition factors pertaining to horizontal and to vertical vignetting"; col 2, lines 11-29; col 2, lines 47-64; col 4, lines 1-9; col 5, line 67 – col 6, line 29; Figs. 2-4; col 3, line 64 – col 4, line 9: "Vignetting phenomena have often the property that the associated attenuation coefficients vary along lines in the image and that said variation is substantially the same along each parallel line in the image. Then compensation for vignetting is achieved by multiplying pixel-values pertaining to a perturbed image by a first correction factor and by a second correction factor. Said first correction factor acts as to compensate for vignetting along a central line in the x-ray image on which a pixel at issue lies; said second correction factor acts as to compensate for differences in the vignetting along lines parallel to the central line from vignetting along said central line").

Bruijns does not explicitly teach that the first corrective image is applied prior to a subsequent application of a second corrective image.

It would have been obvious for one having ordinary skill in the art at the time the invention was made to interpret from the Bruijns' teachings and implement that the first corrective image is applied prior to a subsequent application of a second corrective

image since it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968) (MPEP 2144.01). Bruijns teaches the use of a "first" and "second" correction factors. With one of ordinary skill in the art being well aware that multiplication (gain) is commutative and associative, one can reasonably interpret that the first correction factor is (or can be) applied first and that the second correction factor is (or can be) applied second. Also, on page 10 of Applicant's remarks, Applicant states that "While Bruijns shows two correction factors, it is respectfully submitted that there are innumerable ways of combining the correction factors and pixels together".

Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement that the first corrective image and second corrective image are combined together prior to applying the gains to the planar image, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184 (MPEP 2144.04 (II-A/B)). Note that the multiplication (gain) operation is commutative and associative in general, so the order of application is of no consequence.

Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement that the first corrective image is applied prior to a subsequent application of a second corrective image, since it has been held that constructing a formerly integral structure in various elements involves only routine skill

in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179 (MPEP 2144.04 (V-C)). Note that the multiplication (gain) operation is commutative and associative in general, so the order of application is of no consequence.

Furthermore, It would have been obvious for one of ordinary skill in the art at the time the invention was made to implement that the first corrective image is applied prior to a subsequent application of a second corrective image, since selection of any order of performing steps is prima facie obvious in the absence of new or unexpected results. *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (MPEP 2144.04 IV: C). Note that the multiplication (gain) operation is commutative and associative in general, so the order of application is of no consequence.

As per claim 2, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 2.

As per claim 3, Bruijns teaches the imaging system according to Claim 2, wherein: the first gain correction data comprises a result of an averaging of a plurality of raw images of a gain calibration scan; the second gain correction data comprises a result of an averaging of a plurality of raw images of the gain calibration scan after the plurality of raw images of the gain calibration scan is processed utilizing the first corrective image and an unwarping function is applied to the processed first corrective image (**Bruijns: Fig. 4: particularly, but not limited to, 28-33, 40-47, and 50-53; col 4, lines 1-9; col 4, lines 43-62; col 5,**

**lines 11-19; col 6, lines 1-29; Figs. 2 and 3; Figs. 1 and 4: 29; col 2, lines 54-64: col 3, lines 1- 26: “low pass filter”; Also, see arguments presented for claim 1).**

As per claim 4, Bruijns teaches the imaging system according to claim 1, the image being acquired by means of an image intensifier, wherein the first source of noise comprises a noise of an output screen of the image intensifier and the second source of noise comprises a noise of an input screen of the image intensifier (**Bruijns: col 5, lines 50-63: “In medical x-ray radiography various further origins of vignetting in an x-ray image are known, e.g. variations in intensity in an x-ray beam emitted by an x-ray source, the geometry of the x-ray detection screen, e.g. an input screen of an x-ray image intensifier or the substantially cylindrical shape of a patient to be examined. The vignetting of the x-ray image is transferred to a visible image when the x-ray image is transformed into a visible image, e.g. by an x-ray image intensifier. Such image perturbations are compensated by an imaging system in accordance with the invention to the accompanying drawings”; col 5, lines 42-66; Figs. 1 and 4: 6 and 7).**

As per claim 6, arguments made in rejecting claims 1 or 4 are analogous to arguments for rejecting claim 6.

As per claim 7, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 7.



As per claim 8, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 8. Bruijns further teaches after being processed by an unwarping function (**Bruijns: col 4, lines 1-9; col 4, lines 43-62; col 5, lines 11-19; col 6, lines 1-29; Figs. 2 and 3; Figs. 1 and 4: 29).**

As per claim 9, arguments made in rejecting claims 2 and 3 are analogous to arguments for rejecting claim 9.

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5434902 (Bruijns) as applied to claims 4 and 1 above, and further in view of USPN 5748768 (Silver).

As per claim 5, Bruijns teaches the imaging system according to Claim 4, wherein the first corrective image comprises a drift correction data arranged to correct for a movement of a projection of the output screen of the image intensifier (**Bruijns: col 5, lines 42-66: "For improving spatial resolution, the use of a beam splitter and two optoelectronic sensors has been proposed in the cited reference... Hence, a complete image is divided into two sub-images that are mutually shifted over half a distance between two adjacent pixels in either of the sub-images. Subsequently, both sub-images are recombined, so that a full image results which has an improved spatial resolution"; abstract: "When, in order to improve**

**spatial resolution, the image formed on the output screen of an image intensifier in an x-ray examination apparatus is split into two sub -images which are subsequently recombined, the vignetting effects in either of the sub -images are inevitably different due to the use of a beam splitter"; col 6, lines 30-49).**

Bruijns does not teach during a rotational scan.

Silver teaches during a rotational scan (Silver: col 4, lines 45-64; abstract: "correct offsets...CT"; col 9, line 25 – col 10, line 4: "The present invention as illustrated and described herein, in accordance with the first embodiment, makes corrections for both horizontal and vertical distortions in an image frame, as can occur in CT imaging systems using either a rotating table (i.e., a turntable) configuration or a rotating gantry configuration... rotating gantry... With either the first or second embodiment, many frames (preferably about 100) can be collected at measuring positions and averaged to improve the signal to noise ratio").

Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Silver into Bruijns since Bruijns suggests a system for correcting artifacts in x-ray images wherein an offset is corrected in general and Silver suggests the beneficial use of a system for correcting artifacts in x-ray images wherein an offset is corrected during a rotational scan as to " make[s]

corrections for both horizontal and vertical distortions in an image frame, as can occur in CT imaging systems using either a rotating table (i.e., a turntable) configuration or a rotating gantry configuration" (Silver: col 9, lines 25-40) in the analogous art of image processing.

As per claim 10, Bruijns teaches a computer program (40) (**Bruijns: Fig. 4: 44 and 50**) and the steps of the method according to claim 1 (**See arguments made for claim 1**).

Bruijns does not teach arranged to carry out the steps.

Silver teaches arranged to carry out the steps (**Silver: Fig. 2: 19-33; col 7, lines 6-20: "computer 19 which includes CPU 22, data storage device 23, and memory device 25; and display 24. Memory device 25 stores software subprograms for retrieval and execution by CPU 22, designated as a coordinate locator 27, a curve fitter 29, and a coefficient curve fitter 31"**).

Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Silver into Bruijns since Bruijns suggests a system for correcting artifacts in x-ray images in general and Silver suggests the beneficial use of a system for correcting artifacts in x-ray images wherein steps are implemented in software in the analogous art of image processing. It would have been obvious for one of ordinary skill in the art at the time of the invention to decide to

implement the teachings in software for the benefit of lower cost and greater ease in distributing the system to various locations as well as system maintenance.

Furthermore, one of ordinary skill in the art at the time the invention was made could have combined the elements as claimed by known methods and, in combination, each component functions the same as it does separately. One of ordinary skill in the art at the time the invention was made would have recognized that the results of the combination would be predictable.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Atiba Fitzpatrick whose telephone number is (571) 270-5255. The examiner can normally be reached on M-F 10:00am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571)272-7413. The fax phone number for Atiba Fitzpatrick is (571) 270-6255.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Atiba Fitzpatrick

/A. O. F./

Examiner, Art Unit 2624

/Samir A. Ahmed/

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